

reconsider and withdraw the rejection of Claim 19 under the second paragraph of 35 U.S.C. §112.

Claim Rejections Under 35 U.S.C. §102

The Examiner has rejected Claims 1 through 3, 5, 6, 9 through 11, 13, 14, 16 and 17 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,373,922 to Marra. The Examiner has also rejected Claims 1, 5, 6, 9 through 11, 13 and 16 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,817,455 to Bux. These rejections are respectfully traversed.

Applicant initially notes that the '922 patent to Marra appears to disclose a tuned mass damper ring for damping the natural vibration of an integrally bladed turbine rotor. The Marra device includes a damping ring (14) having a plurality of circumferentially-extending damper beams (46), which are coupled at opposite ends to one of a support (38). Each support (38) is positioned such that its center of mass is positioned precisely under the center of mass of an associated one of the rotor blades (30). The supports (38) include a mounting surface (40) that is formed on their radially outermost portion and sized to engage in a press-fit manner a receptor surface (32) that is formed into the disk (16). The supports (38), therefore, are fixedly coupled to the disk (16) and vibration dampening is accomplished by the bending of the damper beams (46) that interconnect the supports (38) rather than by fingers that frictionally engage the disk (16).

Applicant next notes that the '455 patent to Bux appears to disclose a snap ring that is removably coupled to a groove in a rotor disk of a bladed rotor. The snap ring (32) includes a plurality of locking protrusions (30) at one location only around its circumference. The locking protrusions (30) engage the interlocking protrusions (34) that are formed onto the cylindrical extension (16) that is formed onto the turbine disk (12) to thereby permit the

ring (32) to be placed in a single preselected position relative to the disk (12). The ring (32) is selectively machined to balance the rotor when the ring (32) is assembled to the disk (12). Vibration dampening is apparently accomplished via frictional engagement between the circumference of the ring (32) and the inner diameter of the groove (18) in the disk (12), rather than by tangentially movable fingers.

In comparison, Applicant's invention relates to a damper for damping vibration in an integrally bladed turbine disk. The damper includes an annular member for coupling to the disk and a plurality of fingers that are spaced circumferentially around the annular member. Each of the fingers contacts a surface of the disk and is moveable tangentially with respect to the surface of the disk so as to absorb vibration when the disk vibrates in a diametrical mode shape.

In view of the above summaries, Applicant respectfully submits that neither the '922 patent to Marra nor the '455 patent to Buxte teach or suggest Applicant's invention. In this regard, neither Marra nor Buxte teach or suggest the use of tangentially movable fingers for engaging a disk to attenuate vibration. The supports of the Marra reference are fixedly engaged via press fitting to the disk and are therefore not tangentially movable relative to the disk. The locking protrusions of the Buxte reference are intended to "interlock" or fix the snap ring to the disk and as such, do not appear to permit relative tangential movement between the snap ring and the disk.

Applicant submits that neither the Marra nor Buxte references teaches or suggests a damper that employs a plurality of circumferentially spaced, tangentially movable fingers for dampening vibrations in an integrally bladed disk and as such, respectfully requests that the Examiner reconsider and withdraw the rejection of Claim 1 under 35 U.S.C. §102(b).

Applicant notes that Claims 2 through 9 depend from Claim 1 and as such should be in condition for allowance for the reasons set forth for Claim 1, above.

Applicant notes, too, that Claim 10 includes distinguishing limitations that are similar in nature to those of Claim 1 and as such, respectfully submits that Claim 10 is in condition for allowance for the reasons set forth for Claim 1, above.

Applicant also notes that Claims 11 through 20 depend from Claim 10 and as such should be in condition for allowance for the reasons set forth for Claim 10, above.

Allowable Subject Matter

The Examiner has indicated that Claims 4, 7, 8, 12, 15, 18 and 20 would be allowable if rewritten in an independent format including all of the limitations of their base claim and any intervening claims.

Once again, Applicant thanks the Examiner for the very thorough consideration given the present application. Applicant has not presented Claims 4, 7, 8, 12, 15, 18 and 20 in an independent form at this time, electing instead to pursue patent protection for the independent claims from which these claims depend.

CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding office action, and as such, the present application is in condition for allowance. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned attorney at (248) 641-1600.

Prompt and favorable consideration of this amendment is respectfully requested.

Respectfully submitted,


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APPENDIX FOR AMENDMENTS TO CLAIMS

Serial No. 09/636,536
Inventors: Stangeland et al.

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The claims have been amended as follows:

19. (Amended) The integrally bladed turbine disk assembly of Claim [17] 18, wherein the contact force is received by an arcuate pocket formed into the axial face of the integrally bladed turbine disk.

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